ED 1.310/2:278274

COMPLETED

63

TECHNICAL REPORT SERIES

ORIGINAL

ED 278274

BILINGUALISM AND COGNITIVE DEVELOPMENT: THREE PERSPECTIVES AND METHODOLOGICAL IMPLICATIONS

Kenji Hakuta and Bernardo M. Ferdman
Yale University

Rafael M. Diaz
University of New Mexico

TR2

CLEAR

CENTER FOR LANGUAGE EDUCATION AND RESEARCH

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

C. De Tucker

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

- This document has been reproduced as received from the person or organization originating it.
- Minor changes have been made to improve reproduction quality.
- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

University of California, Los Angeles

FL 016 482

Grill/AM

DOCUMENT RESUME

ED 278 274 FL 016 432

AUTHOR Hakuta, Kenji; And Others
TITLE Bilingualism and Cognitive Development: Three Perspectives and Methodological Implications.
INSTITUTION California Univ., Los Angeles. Center for Language Education and Research.
SPONS AGENCY Office of Educational Research and Improvement (ED), Washington, DC.
REPORT NO TR2
PUB DATE 86
CONTRACT 400-85-1010
NOTE 63p.
PUB TYPE Information Analyses (070) -- Reports - Evaluative/Feasibility (142) -- Viewpoints (120)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Bilingual Education Programs; *Bilingualism; Case Studies; *Cognitive Development; *Cognitive Psychology; Definitions; Educational Research; Intellectual Disciplines; Intelligence Tests; Interdisciplinary Approach; Language Proficiency; Language Research; Minority Groups; Research Methodology; *Research Problems; *Social Psychology; *Sociology
IDENTIFIERS Connecticut (New Haven)

ABSTRACT

The relationship between bilingualism and cognitive development is explored as an exemplary area in which the disciplinary concerns of cognitive psychology, social psychology, and sociology occur together. A historical review of research shows that many of the apparently contradictory findings about the effects of bilingualism on mental development have stemmed from a failure to distinguish between levels of bilingualism as defined by the three different research orientations. The literature within each of the disciplines is discussed and the implications for a more rigorous definition of bilingualism are outlined, based on research undertaken in a bilingual education program in New Haven, Connecticut. Sixty-nine references are listed. (Author/MSE)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

BILINGUALISM AND COGNITIVE DEVELOPMENT: THREE PERSPECTIVES AND METHODOLOGICAL IMPLICATIONS

Kenji Hakuta and Bernardo M. Ferdman
Yale University

Rafael M. Diaz
University of New Mexico

TR2

Center for Language Education and Research
University of California, Los Angeles
1986

Center for Language Education and Research

The Center for Language Education and Research (CLEAR) is funded by the Office of Educational Research and Improvement (OERI) to carry out a set of research and professional development activities relevant to the education of limited English proficient students and foreign language students. Located at the University of California, Los Angeles, CLEAR also has branches at the Center for Applied Linguistics in Washington, D.C., Yale University, Harvard University, and the University of California, Santa Barbara.

CLEAR believes that working toward a language-competent society should be among our nation's highest educational priorities. Thus, CLEAR is committed to assisting both non-native and native speakers of English to develop a high degree of academic proficiency in understanding, speaking, reading, and writing in English and a second or native language. To work toward this goal, CLEAR has united researchers from education, linguistics, psychology, anthropology, and sociology with practitioners, parents, and community agencies.

A coordinated set of research, instructional improvement, community involvement, and dissemination activities are oriented around three major themes: (a) improving the English proficiency and academic content knowledge of language minority students; (b) strengthening second language capacities through improved teaching and learning of foreign languages; and (c) improving research and practice in educational programs that jointly meet the needs of language minority and majority students.

The CLEAR Technical Report Series is designed for researchers interested in issues in second language education and foreign language teaching and research.

OERI Contract #400-85-1010

For further information contact:

Amado M. Padilla, Director
Center for Language Education and Research
1100 Glendon Avenue, Suite #1740
Los Angeles, CA 90024

ABSTRACT

The question of the relationship between bilingualism and cognitive development is treated as an exemplary area in which the disciplinary concerns of cognitive psychology, social psychology, and sociology can be observed. A historical perspective shows that many of the apparently contradictory findings about the effects of bilingualism on mental development have stemmed from failure to distinguish between different levels of bilingualism as defined by the different orientations. The literature within each of the different levels is discussed, and implications for a more rigorous definition of "bilingualism" are outlined. Illustrations are provided from the on-going research program of the authors in a bilingual education program in New Haven, Connecticut.

The problem of researching the relationship between bilingualism and cognitive development at once raises two thorny definitional issues. What do we mean by bilingualism, and what is it that develops in cognitive development? Much of the confusion in this area can be attributed to the lack of theoretical specificity in defining the intersection point of these component concepts. Our primary emphasis in this report will be on the definition of bilingualism, with a secondary emphasis on cognitive development. The reason for the asymmetry is to be consistent with the traditional assumption that bilingualism is the independent treatment variable, and cognitive growth is the dependent outcome variable, even though, as we will see, very few studies actually address the cause-effect issue. The major goal of this report is to demonstrate the great range of social and theoretical contexts in which the question has historically been asked, and to argue for the importance of integrating the many disciplinary levels and perspectives that bear on the problem.

Defining the Component Concepts

The concept of bilingualism has seen varied uses by scholars and lay persons alike. It has been viewed as an individual level, mental concept -- a characteristic of an individual who possesses or who uses two linguistic systems. It has also been viewed as a social-psychological concept, still the characteristic of individuals, but of individuals who organize the social world in terms of the different groups and social situations associated with the two languages in which they interact. Finally, bilingualism has been used as a societal construct, to describe the interactions between social groups and societal institutions, as well as among groups, where the group and institutional boundaries correspond to linguistic boundaries. These different starting points for the definition of bilingualism have resulted in discrepancies in the kinds of statements that have been made about bilingualism and its relationship with cognitive development.

When bilingualism is defined as the characteristic of an individual who possesses two linguistic systems *(cognitive bilingualism)* one tends toward statements about the packaging problem of how two linguistic systems can be fitted in the mind of individuals. It is a cognitive puzzle of the relationship between language and thought, and how these systems are represented neurologically and conceptually. Variables of obvious importance in cognitive bilingualism are the extent to which the individual has mastery of the two languages and the cognitive functions in which the languages are engaged.

Bilingualism defined as a characteristic of the social cognition and affect of the individual *(social-psychological bilingualism)* tends toward social-psychological accounts of the packaging of value systems within an individual. These emphasize not so much the linguistic aspects of bilinguals, but rather the social correlates of the two languages. In this sense of the definition, the grammatical qualities of languages hardly matter; what really matters is the symbolism about group affiliation that the languages convey to the individual.

Bilingualism defined as a characteristic of a societal unit *(societal bilingualism)* is concerned with inter-group interactions in which the two languages serve as a symbol over which interaction occurs. This perspective is not so concerned with individual differences within groups. As in the social-psychological view of bilingualism, the extent of the vitality of the two languages -- vitality in the sense of the extent to which the grammar and form of the languages are maintained -- is not so important in this view, though it can be made to be important depending on social conditions. What matters in this perspective is that language in some way signals membership in a group and serves to maintain the group's cohesiveness and identity.

At the same time that there have been different levels of conceptualization for bilingualism, different theories of cognitive development have preoccupied psychologists of different generations. The earliest systematic attempts to document the

relationship between bilingualism and cognitive development can be found in the beginning of this century. At that time, the primary definition of what we now call cognitive development was a psychometric one, defined on the basis of differential performance of individuals within a defined population on IQ tests. Subsequently, learning theory, skill theory, Piagetian operational thought, Chomskyan rationalism, and Vygotsky's views of mind and society have all offered additional conceptions of what develops in cognitive development.

Although a review of the various theories of cognitive development is far beyond the scope of this report, it is important to consider the dimensions of theories that would or would not predict effects of bilingualism on cognitive development. One might think of bilingualism as an environmental "treatment," to be compared with the alternative treatment of monolingualism.

As a first approximation towards appreciating the range of cognitive theories available, one can begin with commonly used typologies, particularly as relevant to bilingualism. These include nativism versus empiricism, modularity versus commonality of functions, and context and cultural sensitivity versus independence.

With regard to the nativistic-empiricist dimension, any theory of cognitive development that subscribes to primarily innate factors, both with respect to the qualitative aspects of cognition as well as to differences between individuals, would not predict bilingualism to have any effect on the course of cognitive growth. This would include a Chomskyan orientation that attributes the characteristics of our linguistic and other cognitive knowledge to our genetic makeup. It would also include a hereditarian interpretation of individual differences in intelligence, such as that espoused by Jensen (1980). In contrast, theories that emphasize the role of learning and the environment would easily accommodate influences of bilingualism on development. These would include traditional learning theory

and skill theory, as well as Piagetian constructivism.

The second dimension of cognitive theories -- modularity versus commonality of structures -- will predict, given some effect of the bilingual treatment on cognitive development, how it would generalize to other domains of cognitive functioning. For example, Chomsky and Fodor's extreme modular approach (see Piatelli-Palmarini, 1980), where cognitive functions including language are considered to be analogous to structurally autonomous organs of the mind, would find minimal compatibility with broad-sweeping effects of bilingualism. The effects would be confined to the specific aspects of cognitive functioning influenced by the bilingual environment. For example, if bilingualism were to be defined strictly as a linguistic treatment rather than a social or societal one, then the effects would be confined to linguistic aspects of cognitive functioning. On the other hand, learning theory as well as theories of general intelligence and Piagetian operational theory would expect generalized effects since all cognitive functioning share a common source and are interrelated. However, it should be noted that Piagetian theory, though a theory of general intelligence, is characterized by its ascription of a marginal role for language in structuring intelligence.

The third dimension of cognitive theories, the cultural or context sensitivity of theories, holds the strongest promise for relating cognitive development with the social psychological and societal levels of bilingualism. The theory best noted for its emphasis on culture is Vygotsky's, in which specific cognitive functions might exist in rudimentary form as part of the child's genetic endowment, but the majority of the variance in cognitive growth can be explained by the ways in which society amplifies and interrelates these capacities. In contrast, both Chomskyan and Piagetian views on the role of culture are limited.

In this chapter, we make two general points centering upon the definitional considerations of biligualism described above. First, we point to the importance of drawing clear distinctions

between the definitions of bilingualism. Failure to do so can lead to misunderstandings about the role of bilingualism in cognitive development. Second, even though these various perspectives can and should be distinguished, attention should also be paid to the interactions of variables across levels. Indeed, the question of bilingual cognitive development highlights the importance of maintaining multiple perspectives and cutting across levels of analysis in social science.

We make these points using the following structure. The first section takes a historical perspective in examining changes in the way bilingualism has been thought to influence intelligence in children. The section illustrates the importance of maintaining clear distinctions among definitions of bilingualism, while at the same time pointing to the importance of the historical context of research. Then, we follow with a discussion of bilingualism and cognitive development as seen from each of the three levels discussed above -- cognitive, social-psychological, and societal. Obviously, the cognitive perspective has the most to say with regard to cognitive development, but the latter perspectives are important to the extent that social-psychological and societal factors influence the degree of bilingualism that might be attained by the population of interest. In the concluding section, we will draw out the implications of this multi-level analysis of the problem towards a greater understanding of language, mind, and society, drawing from our own research efforts.

SOME HISTORY

If one were to look at the literature on bilingualism and intelligence over its long history, it would at first seem that the early literature showed that bilingualism had negative consequences, while the more recent literature improved on the earlier methodologies and showed the opposite, that is that bilingualism could have positive consequences on cognitive

development. Consider the contrast to be found in following two accounts of the relationship between bilingualism and intelligence. Conclusions from the early literature can be summarized by the following statement that appeared in George Thompson's (1952) American textbook on child psychology:

> There can be no doubt that the child reared in a bilingual environment is handicapped in his language growth. One can debate the issue as to whether speech facility in two languages is worth the consequent retardation in the common language of the realm (p. 367).

Contrast this rather negative picture of bilingualism's effect on cognitive growth with the rather bright portrait drawn by Elizabeth Peal and Wallace Lambert (1962) in reporting a study of bilingual children in Montreal. They describe their typical subject as:

> A youngster whose wider experiences in two cultures have given him advantages which a monolingual does not enjoy. Intellectually his experience with two language systems seems to have left him with a mental flexibility, a superiority in concept formation, a more diversified set of mental abilities.... In contrast, the monolingual appears to have a more unitary structure of intelligence which he must use for all types of intellectual tasks (p. 20).

These statements and their inherent contradictions can be interpreted as a dramatic example of misunderstandings that resulted from failure to distinguish between different levels of definition of bilingualism.

Clearly, if the goal of a study were to establish whether the extent of bilingualism in children had an effect on individual level cognitive development, one should define bilingualism in terms of children's abilities in the two languages. What one should *not* do is to use a societal definition of bilingualism. Yet the earlier literature primarily used a societal definition -- bilinguals consisted of newly arrived immigrants to the United States -- while the more recent literature has tended to use a cognitive definition. In part, this discrepancy in definitions and findings can be attributed to improvements in methodological controls. For example, the more recent studies attempt to control for socioeconomic status of the

comparison groups, while the older studies did not. However, a historical perspective enables us to appreciate why the earlier literature used the societal definition and essentially ignored what are now considered obvious confounds, such as socioeconomic status.

In order to comprehend the early literature and what the debate concerning the relationship between bilingualism and cognitive development was all about, one needs to view it against the backdrop of the concerns of Americans at the turn of the century (see Gould, 1981; Hakuta, 1986). At that time, there raged a social debate over the quality of the new immigrant groups from southern and eastern Europe, a fear that was expressed forcefully by Francis Walker, president of M.I.T. and a prominent spokesperson for immigration restriction:

> These immigrants are beaten men from beaten races, representing the worst failures in the struggle for existence. Europe is allowing its slums and its most stagnant reservoirs of degraded peasantry to be drained off upon our soil (quoted in Ayres, 1909, p. 103).

The various measures of intelligence, particularly in the tradition of Goddard's translation of Binet's IQ test, came to play a major role in this debate, for the immigrants' performance on these tests seemed to confirm the worst fears of restrictionists like Walker.

In explaining the low performance of the new immigrants on intelligence tests, the battle line was drawn between those who believed in genetic versus experiential explanations. Researchers in those days -- including luminaries in the field such as Lewis Terman, Florence Goodenough, and George Stoddard -- debated whether bilingualism was or was not a handicap in the measurement of intelligence.

The hereditarians, who believed that IQ test performance was largely attributable to genetic factors, accounted for the poor test performance of the new immigrants -- those primarily from Southern and Eastern Europe -- in terms of selective migration. The data were considered to support the general fear about the

quality of the new immigrants. The strongest data in support of the hereditarian position were the results of the testing of U.S. Army recruits in World War I, conducted by Robert Yerkes and synthesized and popularized by Carl C. Brigham (1922). The most compelling bit of evidence, in the eyes of hereditarians, was the decreasing intelligence test scores as a function of recency of immigration. Brigham's explanation was as follows:

> Migrations of the Alpine and Mediterranean races have increased to such an extent in the last thirty or forty years that this blood now constitutes 70% or 75% of the total immigration. The representatives of the Alpine and Mediterranean races in our immigration are intellectually inferior to the representatives of the Nordic race which formerly made up about 50% of our immigration (p. 197).

The alternative explanation, of course, was that those with fewer years since immigration had learned less English, and that inadequate proficiency in English resulted in poor test performance. This possibility of a language handicap in test taking was recognized by proponents of the hereditarian position, such as Lewis Terman (1918). He and his students began a full-scale assault on the possibility that the bilinguals might be taking the tests under a language handicap, and attempted to show that the differences existed even despite it (Young 1922). Such heroics notwithstanding, however, it became clear that the recent immigrants -- the bilinguals -- were operating under a handicap. For example, Terman's own student Darsie (1926) showed that bilinguals performed particularly poorly on the subtests of the Binet scale that required language.

Despite evidence of this sort, the hereditarians did not change their position on the genetic quality of the new immigrants. Florence Goodenough (1926), for example, turned the argument around and wrote that "those nationality groups whose average intellectual ability is inferior do not readily learn the new language" (p. 393).

In contrast to the hereditarians, psychologists who emphasized the environmental factors associated with intelligence test scores, spearheaded by George Stoddard and Beth Wellman of

the Iowa Child Welfare Research Station, were trying to explain the poor performance of immigrants using experiential factors (Stoddard & Wellman, 1934). Rather than questioning the validity of the IQ tests for this particular population, they arrived at the conclusion that bilingualism -- an experiential factor -- must cause some kind of mental confusion, resulting in the poor development of verbal skills.

Madorah Smith, who received her doctorate at Iowa, figures prominently in this history. For her dissertation, she had pioneered a method of analyzing free speech utterances of young monolingual children to obtain quantitative indices of language development. Later, she moved to Hawaii, where she began applying her method to the speech of bilingual children from a wide variety of language backgrounds (Smith, 1939). A comparison of these statistics with her Iowa samples showed that bilinguals were inferior to the monolinguals, leading her to the conclusion that "an important factor in the retardation in speech found in the preschool population is the attempt to make use of two languages" (p. 253). (There are many alternative explanations of her data, a discussion of which can be found in Hakuta, 1986).

The twists and turns of this research area can be recapitulated as follows. The backdrop of the initial research was concerned with the new immigrants, who performed poorly on tests of intelligence. The hereditarians argued that this poor performance reflected inferior genetic stock, and attempted to argue against a language handicap in test-taking. The evidence mounted, however, that bilinguals were operating under a handicap. The hereditarians then interpreted this handicap to be the result of innately inferior intelligence. On the other hand, the environmentalists took the language handicap in bilinguals to be the result of experience, in particular the most salient experience to them being exposure to two languages.

What is remarkable about this debate is that the language handicap of bilingualism, initially construed as a test-taking factor associated with a group trait -- namely foreignness and

recency of immigration -- soon became an alleged characteristic of a supposed mental state -- in our terminology, cognitive bilingualism.

How were these early studies of bilingualism and intelligence conducted? They were primarily comparisons of two groups of students, one labeled "bilingual" and the other "monolingual", on the various tests of intelligence (including the Stanford-Binet) that were becoming increasingly popular. And how was bilingualism defined? Societally. For example, studies were conducted in which children were classified as bilingual if they had a foreign last name. What was relevant for these researchers was that bilinguals were from certain ethnic backgrounds that were recent immigrants to the United States. We do not know whether the bilinguals in these studies were actually cognitively bilingual, or were only societally bilingual. It is quite possible that children participating in some of these studies actually were proficient only in their native, non-English language. What these studies suggest to us is that societal bilingualism, being a label in this particular historical context for individuals who are low in the societal totem pole, can be detrimental to performance on tests of intelligence that are used as the basis for predicting success in the educational system. What they do not suggest is that cognitive bilingualism could be detrimental to the mental development of children, since it is uncertain to what extent they were cognitively bilingual.

Indeed, as we will argue in the following section, if we adopt a cognitive definition of bilingualism, as recent studies of bilingualism and cognitive development have done, a relatively consistent picture of a positive relationship emerges. In these studies where bilingualism is defined cognitively rather than societally, the criterion has often been to include only those children who are equally proficient in the two languages.

In general, this shift in the definition of bilingualism from a societal to a cognitive one has gone hand in hand with a

shift in the type of subject population studied. Earlier studies tended to look at immigrants and minorities in the process of language shift from their native language to English. The more recent studies, though not all, have tended to look at subjects who live in societal circumstances where equal proficiency in two languages is possible and advantageous, such as in Canada, and who tend to come from middle-class populations. Thus, in order to appreciate the full range of studies conducted on the topic of bilingualism and cognitive development, it will become necessary to delve into the societal correlates of different types of bilingualism. First, however, we turn to a fuller consideration of the cognitive perspective.

COGNITIVE LEVEL BILINGUALISM

In this section, we review two types of studies conducted strictly at the cognitive level of bilingualism, where subjects are defined in terms of their relative abilities in the two languages, rather than on a social or societal basis. The first type of study looks at cognitive performance in balanced bilingual children; the second type relates children's degree of bilingualism to cognitive ability. The section concludes by documenting the present search for an explanatory model at the cognitive level of how bilingualism might affect the development of children's intelligence.

The concept of the "balanced" bilingual child was conceived by Peal & Lambert (1962) in an attempt to distinguish "pseudo-bilinguals" from truly bilingual children. In our terminology, they shifted the definition of bilingualism from a societal to a cognitive one. Peal and Lambert were responding to the long history of bilingual research, just described, that failed (from the cognitive perspective) to take into account the actual language proficiency of bilingual samples. In their famous monograph, the investigators argued that, in order to understand the effects of bilingualism on children's intelligence, the first

thing that is needed is truly bilingual subjects or, in their new term, a sample of "balanced" bilingual children. Furthermore, they argued that previous negative findings could be attributed to careless sampling procedures, under which subjects' bilingual proficiency was questionable. Several formal definitions of balanced bilingualism have been formulated through the years, some more rigid than others. For the purpose of the present review, we assume the idealization that a balanced bilingual child is a child that can function, age-appropriately, in his or her two languages.

When Peal and Lambert compared their sample of French-English balanced bilingual fourth graders with a group of comparable monolinguals on a battery of intelligence tests, the results were surprisingly in favor of the bilingual children. The study had a significant impact on the field on two different counts. First, the positive findings questioned the validity of a long string of studies that had employed the societal definition of bilingualism and had concluded that bilingualism had a negative influence on a child's language and cognitive development. Second, the study was perceived as a methodological breakthrough. Peal and Lambert's research paradigm (i.e., a comparison of balanced bilinguals with monolinguals, controlling for SES, parental education, years of schooling and other relevant variables) promised to be a sure way to document empirically what linguists' case studies (e.g., Leopold, 1949; Ronjat, 1913) had been claiming for years. The new paradigm, as evidenced by the studies reviewed below, fulfilled its promise.

In a detailed account of his daughter Hildegard's bilingual upbringing, Leopold (1949) not only reported adequate language development and minimal confusion between the child's two languages, but also suggested that bilingualism seemed to be an advantage to his daughter's mental development. Leopold noted Hildegard's special objective awareness of language, proposing that bilingual children, forced to an early separation of word and referent, would develop an early awareness of the abstract

and symbolic nature of language. According to Leopold, such awareness would free the child's thinking from the concreteness and "tyranny" of words. At present, such objective awareness of language is commonly referred to as *metalinguistic awareness*.

A large number of studies have shown that, when compared to monolinguals, balanced bilingual children show definite advantages in measures of metalinguistic awareness. Ianco-Worrall (1972) showed that children raised bilingually outranked monolinguals in the capacity to compare words along semantic rather than phonetic dimensions. Cummins (1978) found that Irish-English and Ukrainian-English bilingual children outperformed monolinguals on several measures of metalinguistic awareness, including the capacity to evaluate tautological and contradictory sentences. More recently, in a study of Spanish-English bilingual children in El Salvador, Galambos (1982) found that bilinguals had a stronger "syntactic orientation" than both English and Spanish monolingual children when judging grammatical and ungrammatical sentences in both languages. Syntactic orientation was defined as the ability "to note errors in constructions, to use syntactic strategies in the correction of these constructions, and to offer syntactically rather than semantically oriented explanations for the ungrammaticality noted" (p. 2).

A study done with Hebrew-English balanced bilingual children (Ben-Zeev 1977) clearly shows bilinguals' awareness of linguistic rules and structure. The investigator gave children a "symbol substitution" task, measuring children's ability to substitute words in a sentence according to the experimenter's instructions. For example, children were asked to substitute the word "spaghetti" for the word "I". Children were given correct scores when they were able to say sentences like "Spaghetti am cold" rather than "Spaghetti is cold" or a similar sentence that, although grammatically correct, violated the rules of the game. Basically, in the symbol substitution task, children are asked to violate the rules of grammar and, in so doing, the task

demonstrates their control over the somewhat automatic production of correct sentences. Needless to say, this task requires an unusual awareness and attention to linguistic features and detail. Through their performance in this and other related tasks, the balanced bilingual children showed a greater objective awareness of language than their monolingual peers.

Bialystok (1984; Bialystok & Ryan, 1985) raised the sophistication of the conceptualization of metalinguistic awareness by arguing that the skill consists of two components: access to the knowledge about language, and the ability to control linguistic processes and apply them to a problem situation. She argued that bilingualism would influence the latter, but not the former. To support her point, she demonstrated that bilingual children were superior to monolingual controls specifically on items with anomalous meanings that were nevertheless grammatically correct. Bialystok argued that these items recruited controlled processing of linguistic knowledge, since the subject has to overlook the meaning and focus on the grammatical form. Bialystok further related her findings to the attainment of bi-literacy, since of the different groups of bilinguals that she tested, the strongest effect was observed among students who had developed the ability to read in both languages. Presumably, the use of both languages in the literate, decontextualized functions (Snow, in press) is an important factor for the effects of bilingualism to take place. The paradigm comparing balanced bilingual to monolingual children also has been used to assess bilingual advantage on measures other than metalinguistic awareness. Balanced bilingual children outperform their monolingual peers on measures of concept formation (Bain, 1974; Liedtke & Nelson, 1968), divergent thinking skills and creativity (Torrance, Wu, Gowan & Alliotti, 1970), and field independence and Piagetian conservation concepts (Duncan & De Avila, 1979) as well as in their capacity to use language to monitor cognitive performance (Bain & Yu, 1980). With unusual consistency, the findings suggest that bilingualism

has a positive effect on a child's developing intelligence.

Despite consistent positive findings, the methodology adopted in the studies of balanced bilingual children has been criticized (see Diaz, in press; Hakuta & Diaz, 1985; MacNab, 1979). The foremost criticism is that bilingual and monolingual groups are not comparable groups. Children are not randomly assigned to bilingual or monolingual upbringings and, more often than not, childhood bilingualism co-occurs with variations in a wide range of socioeconomic, cultural, educational and ethnic variables. Regardless of experimenters' efforts to match the groups on relevant variables, good experimental science tells us that cognitive differences between bilinguals and monolinguals could ultimately be explained by differences other than proficiency in a second language.

A second criticism of this line of research points out the exclusive focus on balanced bilingual children. These children are not representative of the majority of children who are exposed to two languages at an early age or who are educated bilingually. The findings, therefore, cannot be generalized to most populations of interest. Finally, the conclusion that bilingualism has a positive effect on children's cognitive development has been criticized on account of its gross inference regarding causality. The finding that balanced bilinguals outperform their monolingual peers can also be interpreted in the reverse way: that only the most intelligent children become the truly balanced bilinguals. Research comparing balanced bilinguals and monolinguals cannot distinguish between these two alternative explanations. Of course, a third alternative explanation is that other factors are related to both balanced bilingualism and cognitive ability.

Degree of Bilingualism and Cognitive Ability

A second group of studies, more modest in number than the studies just reviewed, has attempted to deal with current methodological criticisms by studying the effects of bilingualism using a "within-bilingual" design. The effort is directed at

relating, within a group of bilingual children, the degree of a child's bilingualism to his or her cognitive abilities. The claim is that, by using a within-bilingual design, a study will not only avoid the bilingual-monolingual comparison, but also will necessarily include children who are non-balanced bilinguals. In addition, the inclusion of a longitudinal component in some of these studies has allowed for some analysis of the direction of causality between bilingualism and cognitive variables.

In one of the first attempts to use a within-bilingual design for assessing the cognitive effects of childhood bilingualism, Duncan and De Avila (1979) studied children from four Hispanic populations who differed in their relative abilities in English and Spanish. Based on their scores on the Language Assessment Scale (LAS), children were assigned to one of five language proficiency groups: Proficient Bilinguals, Partial Bilinguals, Monolinguals, Limited Bilingual and Late Language Learners, where Proficient Bilinguals had the highest scores and Late Language Learners the lowest scores in both languages. Subjects were given several tests of cognitive ability, including two measures of field independence and a measure of Piagetian conservation concepts.

Duncan and De Avila reported two major findings. First, Proficient Bilinguals ranked higher than any other proficiency group on all cognitive measures; and second, no differences were found between Partial Bilinguals, Limited Bilinguals and Monolinguals on the same measures. Specifically, the data ranked the five proficiency groups in the following order: (1) Proficient Bilinguals; (2) Partial Bilinguals, Monolinguals and Limited Bilinguals; and (3) Late Language Learners.

The investigators pointed out that the lack of a significant difference between partial bilingual, limited bilingual and monolingual groups questions the "usual view of limited-English speaking children as being intellectually inferior to their monolingual peers" (p. 16). In addition, supporting Cummins'

(1976) threshold hypothesis, they concluded that, after a certain threshold of proficiency in the two languages, bilingualism is clearly related to positive cognitive gains.

A major problem in interpreting Duncan and De Avila's (1979) data is that the observed rank-ordering of proficiency groups could be attributed simply to group differences in intellectual ability or I.Q., rather than to differences in degree of bilingualism. Since the authors did not control for group differences in a measure of basic ability, it is possible that the Proficient Bilinguals and the Late Language Learners represent the opposite tails of the I.Q. distribution. This I.Q. or basic ability confound, to which within-bilingual designs are vulnerable, has been dealt with by Hakuta and Diaz (1985), Diaz and Padilla (1985) and Diaz (in press) by the use of multiple regression techniques, as explained below.

The multiple regression approach advocated by the present authors proposes that the effects of bilingualism on cognitive ability could be assessed by estimating the variance explained by second-language proficiency, once the variance explained by first-language ability and other relevant variables (such as age and socioeconomic status) is partialed out from the analysis. Specifically, the following hierarchical regression equation is proposed for the analysis of the data:

Cognitive Ability	=	First Language Proficiency	+	Age + SES	/ +	Second Language Proficiency

where the outcome variable is any measure of cognitive ability appropriate for the age of the sample, the measure of first-language proficiency is considered a measure of "basic ability" and the measure of second-language proficiency is entered last in the equation. The claim is that any changes in the variance explained (R-squared) produced by the inclusion of second-language proficiency as the last variable in the equation is a good estimate of the effects of bilingualism on a child's cognitive ability.

Three recent studies have used the multiple regression approach (Diaz, in press; Diaz & Padilla, 1985; Hakuta & Diaz, 1985) to examine the effects of bilingualism in preschoolers, kindergarten and first-grade children who were, at the time, attending bilingual education programs. The measures of cognitive ability included measures of analogical reasoning, metalinguistic awareness and visual-spatial skills for kindergarten and first-grade children, and measures of classification, story-sequencing and block designs for preschoolers. Overall, the findings of the multiple regression analyses indicate significant contributions of second-language proficiency on most of the cognitive abilities measured. As reported by Hakuta and Diaz (1985) and Diaz (in press) the findings were particularly strong for the effects of bilingualism on the Raven's Progressive Matrices, a commonly used measure of nonverbal intelligence.

Hakuta and Diaz (1985) and Diaz (in press) report several analyses of direction of causality between bilingualism and cognitive abilities. The analyses were done on short-term longitudinal data with measures of language proficiency and cognitive ability at two points in time. Even though causality cannot be appropriately determined from correlational data, longitudinal designs allow for an examination of the direction of causality between two sets of variables. Using both multiple regression and path analyses techniques, the authors report stronger relations between language variables at Time 1 and cognitive variables at Time 2 than vice-versa. Recognizing the limitations of their correlational data, the authors make the case for the argument that, if bilingualism and intelligence are causally related, bilingualism is most likely the causal factor.

Two additional findings, reported in Diaz (in press), are worth noting. First, in contrast to Cummins' (1976) threshold hypothesis, which predicts positive effects of bilingualism at high levels of second-language attainment, these data suggest that degree of bilingualism may have a stronger effect on

cognitive abilities for children who are at the beginning stages of second-language learning. When Diaz (in press) examined the regression equations for groups of relative high and low second-language proficiency separately, the variance explained by degree of bilingualism was significant and substantial for the low group on most cognitive measures, while weak and nonsignificant for the high group on the same measures. These findings suggest that some effects of bilingualism might occur as a result of the initial struggles and experiences of the beginning second-language learner. This does not rule out the possibility that there may be additional effects at the high threshold level.

A second important finding is that groups of high and low second-language proficiency are significantly different on measures of socioeconomic status, suggesting an SES-bilingualism confound even within a somewhat homogeneous group of Spanish-dominant children who are learning English in the context of bilingual education programs. It is for this reason that SES should be controlled for in the hierarchical regression equation.

We will address the problem of how to interpret this confound in our later section on societal bilingualism.

A Review of Explanatory Hypotheses

The positive relation between cognitive bilingualism and children's other cognitive abilities is well replicated. Beyond the issue of causality, a major gap in our knowledge is how to explain this positive relation. That is, if bilingualism affects children's intelligence, how does it happen? As Diaz (1985) has suggested, "the gap in our knowledge is due in part to the fact that research has focused mostly on outcome rather than process variables" (p. 19). Such a focus on outcome variables does not clarify such issues as, for example, whether bilinguals solve cognitive tasks differently from monolinguals, or whether the positive effects are explained by a faster rate of cognitive development fostered by the bilingual experience. Nonetheless, regardless of the scarcity of process data, several hypotheses have been formulated to explain the positive results.

The code-switching hypothesis. Code-switching refers to the observation that bilinguals can move from one language to the other with relative ease. As an explanatory hypothesis, code-switching was proposed first by Peal and Lambert (1962) when explaining their pioneer findings. The investigators believed that the possibility of switching linguistic codes while performing cognitive tasks gave bilingual children an added flexibility that monolingual children did not enjoy. In their own words:

> More often than not, errors in cognitive and academic tasks are caused by children's perseveration on the wrong hypothesis. Bilingual code-switching might, indeed, facilitate the development of a more flexible "mental set" to approach cognitive tasks. Furthermore, when a bilingual child is frustrated or blocked when performing a task verbally, he or she has the possibility of switching to the second language, starting the problem once again with a fresh and different perspective.

The objectification hypothesis. In a large number of studies, bilingual children have shown a special objective awareness of language. The second hypothesis claims that bilinguals' objectification of language is conducive to higher levels of abstract and symbolic thinking.

As suggested by Leopold (1949), bilingual children have two words for each referent and, early on, are forced to realize the conventional nature of language. The separation of word from referent is seen as one of the major milestones in the development of symbolic thinking. Furthermore, as Vygotsky (1962) suggested, since bilinguals could express the same thought in different languages, a bilingual child will tend to "see his language as one particular system among many, to view its phenomena under more general categories, and this leads to an awareness of his linguistic operations" (p. 110). In other words, according to this view, learning more than one language leads not only to knowledge of a second language but to a knowledge of "Language." Through this objectification process, the hypothesis suggests, children are able to bring their concepts to a higher level of symbolism and abstraction.

The verbal mediation hypothesis. Cognitive development in the preschool years is heavily influenced by children's increasing reliance on language as a tool of thought (Luria, 1961; Vygotsky, 1962). The use of language for self-regulatory functions, commonly referred to as "private speech", appears shortly after the onset of social speech and gradually becomes subvocal to constitute inner speech or verbal thinking. The internalization of private speech forms the basis for the capacity to use covert verbal mediation. The origins, development and internalization of private speech have been documented elsewhere (e.g., Frauenglass & Diaz, 1985; Zivin, 1979).

Several investigators (Bain & Yu, 1980; Diaz, 1983; Diaz & Padilla, 1985) have suggested that the unique linguistic experience of bilingualism and the accompanying awareness of language might lead to an increasing reliance on verbal mediation in cognitive tasks. In fact, bilingual advantage on some nonverbal measures (such as the Raven's test) has been explained in terms of bilinguals' increasing reliance on covert verbal or linguistic strategies when solving the tasks (Hakuta & Diaz 1985). It is possible, as the hypothesis suggests, that the bilingual experience and the resulting metalinguistic awareness foster a more efficient and precocious use of language as a tool of thought. Bilinguals' improved performance on so many different tasks could be explained by this efficient reliance on self-regulatory language.

Evaluating and Integrating the Models. No single study has tested a model of the process by which bilingualism might affect a child's cognitive development. Nonetheless, the data from several studies can be pooled and integrated, first, to examine the validity of the hypotheses reviewed above, and second, to outline some empirical constraints for the development of an explanatory model of the relationship between bilingualism and cognitive ability.

In a study of the self-regulatory private speech of bilingual preschoolers, Diaz and Padilla (1985) reported two major findings that shed light on the verbal mediation and code-switching hypotheses. First, the study reported a positive relation between degree of bilingualism and production of task-relevant private speech utterances. Children in this sample with a relatively higher degree of bilingualism in this sample not only emitted more self-regulatory utterances but also used a higher number of task-relevant language functions such as labeling and description of materials, transitional utterances, guiding, and planning statements. This first finding gives some support to the hypothesis that bilingualism fosters an increased and more efficient reliance on language in cognitive tasks.

The study also examined the patterns of language switching in the private speech protocols. If the code-switching hypothesis were correct, three observations would be expected: a) within a given task bilingual children should switch or use more than one language, b) the incidence of language switching should increase with tasks of increasing difficulty, and c) the frequency of language switch should be positively related to children's performance on the tasks. The findings, however, supported none of the three predictions. The observed frequency of language switch in private speech was minimal (less than 2%), even for those children who could easily switch languages in social situations. The findings suggest that, at least in bilingual preschoolers, language switching is a social and not an intra-personal, cognitive phenomenon.

To summarize the previous discussion and review, a process model should take into account the following research findings:

(1) Bilinguals show consistent advantages on metalinguistic awareness and in the use of language as a tool of thought

(2) There is no evidence for the suggestion that bilinguals switch languages spontaneously while performing cognitive tasks.

(3) If bilingualism affects a child's cognitive development, the effects can occur at the beginning stages of second language learning as well as at the more advanced stages of balanced bilingualism.

(4) Bilingual environments in which the languages are used for functions that require controlled cognitive processing lead to stronger effects on metalinguistic awareness.

(5) The positive effects are found in bilingual additive situations (i.e., contexts where the second language is acquired without loss of the mother tongue) that involve a somewhat systematic use of the two languages.

Taking into consideration present findings on bilingual cognitive development, we offer the following integrative hypothesis: the systematic exposure to two languages found in bilingual additive situations will give children a unique advantage in the objectification of language. Such objectification of language, in turn, will foster an increased and more efficient use of language for self-regulatory functions.

These effects will be more pronounced in contexts where the decontextualized functions of language engaged in information-processing tasks is emphasized, rather than conversational functions of language.

Cognitive Bilingualism in Perspective

To obtain clear answers to cognitive questions, studies must be designed with a cognitive perspective on bilingualism in mind. However, a selective focus on individual cognitive effects, when properly studied, is gained at the expense of losing contact with social-psychological and societal aspects of bilingualism. Remember that what properly designed cognitive studies attempt to do is to control for societal background characteristics such that the "pure" effects of bilingualism can be discerned.

Searching for such controls may be a futile and unrealistic endeavor.

Researchers concerned with the cognitive effects of bilingualism have often made methodological points regarding proper design of studies to answer such questions. Barry McLaughlin (1985) describes the ideal study as one that would include random assignment of children to bilingual and monolingual groups, as well as longitudinal testing and control of relevant variables, such as intelligence. In the same book in which McLaughlin's chapter appears, *Early Bilingualism and Child Development*, Lebrun and Paradis (1984) title their introduction "To be or not to be an early bilingual?".

Although such experiments and such questions are important to pursue, one must question their ecological validity. To whom would the findings of a study with random assignment be applied? To randomly assigned children? A focus on the social-psychological and societal aspects of bilingualism highlights the way in which bilingualism is distributed in the population in a non-random fashion. For many children, it is not a matter of individual preference whether "to be or not to be an early bilingual," and in any case, it is not a decision made by families and children on purely cognitive grounds. Moreover, the presence of two languages in an individual's environment may affect a variety of other variables that in turn may be responsible for any cognitive effects. McLaughlin (1984) does point out that the family environments of children raised monolingually are probably different from those of children raised bilingually, and that therefore it is impossible to separate the environmental effects on linguistic and cognitive variables from those of bilingualism itself. MacNab (1979) makes similar points in discussing the limitations of many of the cognitively oriented studies in this area.

In this section, we reviewed constraints on models of the relationship between bilingualism and cognitive development and proposed an integrative hypothesis. This is not sufficient,

however, because so far, we have treated individual level cognitive bilingualism as the independent variable, and have not paid attention to factors associated with the social environment in which bilingual children develop. A more complete model must consider the context of bilingual cognitive development. In the following section, we consider perspectives that take into account the social-psychological and societal correlates of bilingualism and then discuss their implications for our models of the relationship between bilingualism and cognitive development.

SOCIAL PSYCHOLOGICAL AND SOCIETAL BILINGUALISM

The issues of language and cognition aside, bilingualism has captured the interest of social scientists precisely because of its correlation with social-psychological and societal phenomena of interest to them. Ethnographers such as John Gumperz (1982) take interest because of the roles that language plays in regulating social order by serving as a symbol of group identification and societal status. Sociologists such as Joshua Fishman (1971) take interest because language is correlated with the traditional institutional categories of the sociologist, such as the domains of society where language can be used. These other perspectives on bilingualism are important for the student of bilingualism and cognition because they grapple with the question of the determinants of the distribution of bilingualism. Even though we may establish that certain types of cognitive bilingualism are related to mental development, these types of cognitive bilingualism are not characteristics randomly distributed in the population. Bilingualism is rooted in a set of social conditions which lead particular individuals to particular outcomes.

Aside from trying to arrive at a "pure" assessment of the relationship between bilingualism and cognition, then, we need to consider the conditions under which varying types of bilingualism

might obtain, and how these might be related to the cognitive models elaborated in the previous section. Investigations of the cognitive effects of bilingualism must be accompanied by an investigation of the parameters within which bilingualism occurs. Joshua Fishman (1977) makes this point quite well:

> My own socio-historical perspective leads me to doubt that answers...can be found by better controlled experiments, which in essence, cannot explain shifts in social climate that take place across a decade or more. I would predict that every conceivable relationship between intelligence and bilingualism could obtain, and that our task is not so much the determination of whether there is a relationship between the two but of when (i.e., in which socio-pedagogical contexts) which kind of relationship (positive, negative, strong, weak, independent or not) obtains (p. 38, emphasis original).

In one of the early attempts to account for the contradictory findings on the effects of bilingualism, Lambert (1975) proposed a distinction between additive and subtractive bilingualism. The distinction between these terms hinges on the context in which bilingualism develops and thus effectively integrates a social-psychological perspective into the question of the effects of bilingualism. The concepts were developed to explain the divergent findings of studies that looked at immigrant or minority children from those looking at majority children in immersion programs. Additive bilingualism is said to occur when an individual acquires a second language at the same time that all abilities in the first language are maintained. In such situations, there is no threat of loss of the first language. This is the type of bilingualism most often seen in situations where children of the dominant ethno-linguistic group in a society learn the minority language at school, such as the case of Anglophones learning French in Canada. It can also be found in situations where the maintenance of language minority children's first language, although societally subordinate, is strongly promoted at school.

Subtractive bilingualism (also termed replacive bilingualism), on the other hand, refers to situations in which

the group shifts in the direction of the second language while losing its ethnic language. The language situation of immigrant children is characterized by this type of bilingualism, in which they never fully develop their abilities in their home language while they are instructed at school in a new language, that of the host culture. In this subtractive situation, it is likely that children will be less proficient in each of the two languages than would monoglot native speakers (Cummins, 1984).

Rather than describing the characteristics of the individual, these terms are better seen as describing the social milieu in which an individual develops his or her language abilities. The effects of each of these types of bilingualism cannot be understood in isolation from an analysis of the environment of the individual. Additive bilingualism occurs when the society values both languages and sees acquisition of the second language as a positive aspect in the child's development. This type of bilingualism occurs in situations where the linguistic and cultural systems represented by the two languages exist in a complementary fashion. In contrast, subtractive bilingualism exists where these two systems are in competition or conflict. Schooling for ethno-linguistic minorities in a society may only be available in a language different from the home language. The society may not value the minority's language and upward mobility may only be possible when the majority language is acquired. Such acquisition may be associated with a loss of the original home language. More significantly, a social milieu of subtractive bilingualism is likely to be associated with quite different characteristics in terms of home support for language development than an additive situation. In sum, these variant social conditions are seen as leading to different types of individual level, cognitive bilingualism.

Cummins (1976, 1984) developed the threshold hypothesis cited earlier in order to explain why these different situations might impact on bilingual children's cognitive development. This view explains the effects found in additive and subtractive

situations in linguistic and cognitive terms by seeing the development of children's level of proficiency in each language as a variable mediating the cognitive consequences of bilingualism. The particular social environment in which the child acquires language leads to different types of cognitive bilingualism, which in turn affect cognitive development by resulting in different relative levels of proficiency in each language. What is important about Cummins' theoretical framework is that it explicitly recognizes the way in which linguistic and cognitive development must be understood as occurring within a sociocultural context. It is the differences among these types of societal bilingualism that lead to the variety of cognitive findings.

Also important to know are the conditions that lead to each of these types. By considering bilingualism, or more precisely, degree and/or type of bilingualism, as a dependent variable, one can ask what social conditions lead to different characterizations of bilingual proficiency, both at the group and individual level. We will first discuss individual level, social-psychological variables accounting for bilingualism. Then we will discuss group level factors. In both cases, however, we attempt to look for precursors to individual degree of bilingualism.

Social-Psychological Perspectives

Robert Gardner (1983) addresses this question from the perspective of social-psychological variables at the individual level. Subjects in his research come mostly from the English-speaking parts of Canada, and thus are primarily speakers of the majority language learning a second language in a social milieu where there is little contact between the two language groups. Gardner has used primarily paper-and-pencil attitude measures and correlates them with various measures of second-language acquisition.

Gardner accounts for the findings from his many studies through a socio-educational model (based in part on Carroll, 1962

& Lambert, 1967) that emphasizes four elements involved in second-language acquisition: the social milieu for learning, individual difference variables (including attitudes, motivation, and language aptitude), the contexts for language acquisition, and outcomes.

Gardner hypothesizes that the cultural beliefs developed within a particular social milieu influence the development of attitude variables, which include integrativeness--referring to positive affect towards the other language community--and attitudes toward the learning situation--referring to the individual's evaluative feelings about the learning context. These two types of attitudes, in turn, influence the individual's motivation. The *integrative motive* is the composite of these three variables. This notion of an integrative motive was developed from Lambert's (1967) distinction between an instrumental orientation towards learning a second language--when the language is primarily being learned for utilitarian reasons--and an integrative orientation--when the language is acquired because the individual wants to learn more about the language group or even join it.

A further hypothesis of the model is that motivation and language aptitude, two individual difference variables, interact with the context of language acquisition--formal or informal--to influence the development of language proficiency and the outcomes of second-language acquisition, which include both linguistic and non-linguistic effects. In formal acquisition contexts, such as classrooms, aptitude and motivation are both seen as being important, while in informal contexts, motivation becomes predominant because it affects whether the learner will take advantage of the available opportunities. The outcomes need not be just linguistic--that is, language knowledge and skills--but can also be non-linguistic--for example, the degree to which the individual wishes to learn more of the language, and his/her attitudes towards the second language community.

Gardner's model is important because it clearly links cognitive variables to social ones such as attitudes. It addresses some of the complexity inherent in the development of bilingualism by viewing second-language learning as a dynamic process affected by a variety of factors acting on each other.

Unfortunately, however, much of the research supporting Gardner's model has been done only in situations in which majority language children are studying a second language in school. In these contexts, the model has received a good deal of empirical support. As Gardner (1983) points out, little work has been done linking the social milieu to the individual difference variables. Although acknowledged within the model, this connection is left in a general and unelaborated state. When bilingualism is seen from a societal perspective, this is a crucial link to elucidate theoretically in our view. Because Gardner's model has not been tested in situations involving a variety of intergroup conditions, we do not know in what range of contexts it will be valid. An example of its limitations as a tool for understanding the situation of minority language children is that Gardner's model says nothing about the role of the individual's first language. Clearly, this takes on different importance in situations of language minority children learning the dominant language than in situations where majority children are learning a foreign language.

Fred Genesee (1984; Genesee, Rogers, & Holobow, 1983), in attempting to expand Gardner's model to bilingual, cross-cultural contexts by including intergroup factors in the model, has examined the role of the second-language learner's perceptions of motivational support by the target language group. He defines this more explicitly as the "learner's beliefs or expectations that his/her motives for learning a second language are supported by the target language group" (Genesee 1984, p. 347). Genesee et al. (1983) studied English Canadians learning French. They found that motivational support predicted second-language learning independently of self-motivations. In other words, those

students who thought that French Canadians wanted them to learn French showed greater French proficiency and expressed more willingness to interact with French Canadians.

In a different context, such as that of Spanish-speaking minority children learning English in the United States, motivational support may take on a different quality. It may represent more of a negative force -- for example, those who feel that Anglos' attitudes towards Hispanics are uninfluenced by their English proficiency may learn English less well. This raises a number of complexities, however, that will be more fully addressed in our discussion of Howard Giles's work below.

An important issue in applying Gardner's theory to different language learning situations is that of variance on the variables included in the model. Gardner (1979) found, for example, that there were higher correlations between language achievement and both motivation and language aptitude in monolingual communities than in bilingual communities. This led him to suggest that the second-language learning process may differ in these two types of communities, or for language majority and minority group members. One way in which this may be the case is that there is much more room for variability on the variables in the model for language majority members than for language minority members, in particular in situations where clear social policies exist that shape the educational environments of children who do not come from homes where the dominant language is spoken.

In spite of its limitations as a complete model for understanding what leads to different types of bilingualism, Gardner's theory is useful in understanding how particular contexts may influence the way children learn at the individual level. The theory clearly brings in social causes for cognitive effects, and can serve as a link with more macro-level theories. Indeed, one way in which the model can be elaborated is in terms of the way various cultural beliefs may come about and influence attitudes and motivations.

So far, we have looked at theories that address, from the perspective of individual as individual, how various social contexts might lead to different levels of bilingual proficiency. We can elevate the question of social context to the level of groups by exploring how the pattern of intergroup relations and individuals' beliefs about them and about their own social identity can affect language acquisition and proficiency as well as cognitive performance. At this point, we bring in theoretical perspectives that include concepts of the individual as group member, and consider how these may shed light on the development of different types of bilingualism.

Societal Perspectives

When we use concepts such as *ethnolinguistic vitality* (Giles, Bourhis, & Taylor 1977) and *diglossia* (Ferguson, 1959; Fishman, 1971) as they relate to bilingualism, we are no longer speaking of individual level variation, but rather bilingualism found in the group as a whole. Earlier, we described one particularly useful societal concept -- the distinction between additive and subtractive bilingualism, proposed by Lambert (1974) -- used in accounting for different findings among the studies of bilingualism and intelligence. What leads to these different situations is best analyzed from the societal level, since the concept is most meaningful in terms of group, rather than individual, bilingualism.

The dynamics of societies in which bilingualism exists is usefully described by theories that have been developed to discuss interethnic relations. One of the most frequent situations in which bilingualism has been described is that of language minorities learning the language of the dominant societal group. Christina Bratt Paulston (1980; Paulston & Paulston, 1980) has effectively applied Schermerhorn's (1970) group conflict theory to this kind of bilingualism. She describes the societal conditions that are likely to lead to group bilingualism -- in particular, the role of different types of interethnic contact -- and the role that language plays in the

maintenance of boundaries among ethnic groups.

Paulston's analysis highlights the role of power in a society and of the possibilities available to ethnic minorities to become integrated into the dominant group. She points out, for example, that in the United States, when job opportunities have been available that require learning English, minority groups have done so. When these opportunities have not been available, it is less likely that members of these groups will learn English. Maintenance of the mother tongue also is seen as dependent on its role for the group, and this in turn is affected by the group's relationship to other groups in the society. For example, the dominant group may expect assimilation on the part of the subordinate groups. The latter groups may differ on whether or not they agree with this goal. In the case of conflict, maintenance of the mother tongue then becomes a symbolic way of resisting assimilation and maintaining a distinctive identity.

Important here is how the contact originated, for example whether the minority group in question is an indigenous or an immigrant group. Under conditions of interethnic contact, dominant groups, whether subordinate or superordinate, are likely to maintain their mother tongue (Lieberson, Dalto, & Johnston, 1975), whether or not they learn a new one. Among subordinate groups, however, indigenous peoples are more likely than immigrants to resist a rapid shift in mother tongue. Examples of such groups in the United States are the Puerto Ricans, the Chicanos, and Native Americans, all living in areas annexed or colonized by the U.S. Lieberson et al. (1975) show how these and other indigenous groups, such as French-speaking whites in Louisiana, evidence a much slower rate of language shift than immigrant populations. Paulston attributes this to the degree of resistance to assimilation.

Thus, from this perspective, language is an important symbol in the intergroup dynamics within a society. Paulston examines this issue from a sociological perspective, considering groups as

the units of analysis. Also important is a consideration of individuals within these groups. Giles and his colleagues have proposed an intergroup theory of second-language acquisition that accounts for the development of proficiency in the dominant language on the part of members of ethnolinguistic minorities, using as explanatory constructs social-psychological concepts derived from ethnolinguistic identity theory (Ball, Giles, & Hewstone, 1984; Giles et al., 1977; Giles & Byrne, 1982; Giles & Johnson, 1981) and from social identity theory (Tajfel, 1978; Tajfel & Turner, 1979). This theoretical perspective is useful in understanding the intergroup factors that may affect individual language behavior and outcomes.

The basis for the intergroup model of second-language acquisition is ethnolinguistic identity theory (Ball et al., 1984; Giles & Johnson, 1981). This theory makes predictions about the conditions under which individuals will perceive language as an important aspect of their social identity and will attempt to attain "positive psycholinguistic differentiation from outgroups" (Ball et al., 1984, p. 674). Individuals' group memberships form an important part of their social identity, which can be positive or negative depending on how one perceives one's own group as doing relative to other groups (Tajfel & Turner, 1979). In this view, people are seen as motivated to develop a positive social identity by comparing themselves favorably to outgroups. In many cases, language can become a salient dimension for comparison, and thus a source of either favorable or unfavorable social identity.

When individuals experience a "negative ethnic identity" they may respond with various intergroup strategies designed to recover a positive sense of their social self (Ball et al., 1984; Tajfel, 1981; Tajfel & Turner, 1979). These include individual mobility (trying to "pass," which can result linguistically in loss of ingroup speech markers), social creativity (the redefinition of ingroup-outgroup comparisons, which can result in the upgrading of the status of an ingroup language or dialect or

the creation of new ones), and social competition (which can result in overt intergroup conflict.) Each of these strategies on the part of members of a subordinate group in a community or society may be countered by members of the dominant group; for example, new ingroup linguistic markers could be invented, thereby keeping the outgroup out (cf. Giles & Johnson, 1981).

The theory proposes that to the extent that language is a salient dimension for intergroup comparisons, which is most likely in interethnic contexts, it will be a focus of the intergroup strategies used by individuals. In these situations "accentuation or attenuation of ingroup speech markers" (Ball et al., 1984, p. 674) would be expected. Ball et al. (1984) give five conditions under which people will attempt to distinguish themselves from outgroups on the basis of language. These are when they:

(1) identify strongly as members of a group with language as an important dimension of its identity;
(2) regard their group's relative status as changeable and attribute the cause of their relative social status to advantages taken unfairly by the outgroup;
(3) perceive their ingroup's ethnolinguistic vitality as high;
(4) perceive intergroup boundaries as hard;
(5) identify with few other social groups and/or with ones which offer only unfavorable social comparisons (p. 674-75).

The reverse of these conditions is proposed to lead to attempts to assimilate with the outgroup and to attrition of the ingroup language.

Ball et al. (1984) use these propositions in constructing a model that predicts when members of a subordinate group will acquire native-like proficiency in the dominant language. They distinguish between sub-groups of the language minority to whom

the above propositions do and do not apply. For the first group, who are predicted to experience fear of assimilation and to avoid informal learning contexts, the model predicts that intelligence and aptitude are important predictors of proficiency. In contrast, for the second group, who have integrative motivation and do seek out informal learning contexts, proficiency is predicted to be more related to factors such as anxiety in situations of second language use. Clearly, the behavior of the outgroup in reaction to the changes in language proficiency on the part of minority group members becomes important in predicting subsequent perceptions and interactions, although this factor does not play a key role in the model.

Ball et al. also attempt to account for the large group of "intermediates", those individuals who do not fit clearly into either of the above sub-groups. They use mathematical catastrophe theory to develop a cusp model of second-language acquisition that predicts motivation primarily from the perceived vitality of the learner's first language and the perceived hardness of the intergroup boundaries between the language groups. Individuals who perceive their own language as being low in vitality will exhibit motivation to learn the outgroup language as a monotonic function of the perceived softness of the intergroup boundary.

When own language vitality is perceived as high, however, a different relationship is predicted. For high and low perceived boundary hardness, the lowest and highest motivation levels, respectively, are predicted. For intermediate hardness, however, a bimodal distribution is predicted--in other words, learners are predicted to polarize in terms of their motivation, so that some will have quite integrative motives and others will not be very willing learners and will fear loss of identity. This situation is one in which learners see their own language as not being in any danger of loss, and thus must assess likely reactions to their acquisition of the outgroup language. If the intergroup boundaries are perceived as permeable, but not easily so,

learners could "go either way", as it were. They could decide that the outgroup will not accept them anyway, so why bother with the second language; or, they could decide that, with some effort, intergroup barriers could be overcome, and therefore it is worth "investing" in second-language learning.

There are three features of the work of Giles and his colleagues that make it important in the context of this paper. First, in considering the social-psychological variables that affect whether particular individuals will acquire a second language and the level of proficiency with which they will do so, Giles and his co-workers explicitly recognize the extent to which language serves as a marker of group membership and social identity. Their model focuses on the functions of language in its important symbolic and practical role in the formation and maintenance of ethnic identity.

Second, the model attempts to account for individual behavior *within* an ethnic group. The theory successfully integrates group and intergroup level concepts with an analysis of the social-psychological variables likely to affect an individual's behavior. The question asked by Giles and Johnson is "who in an ethnic group uses which language strategies, when and why?" (1981, p. 214). In terms of attempting to account for cognitive data, conceptualized and measured at the level of the person, it is important to make such a theoretical link between sociological models that make predictions for whole groups or sub-groups, and purely individual level accounts that do not consider the importance of language in the context of society and intergroup relations. In this model the individual is primarily a group member.

Third, the model developed by Giles and Byrne (1982) and Ball et al. (1984) is formulated in such a way that it is testable in a broad range of situations. The basic concepts used are applicable to a variety of ethnic groups and to different types of "language", including dialects. In a sense, this aspect of the model is also a shortcoming in the current context,

because what Giles and his colleagues are attempting to describe is not a process of acquiring language proficiency in the way we described it earlier. Rather, what they do is describe the way in which language acquisition and use may be one of the means by which group members seek to enhance their social identity. This process then can be seen to have important effects on ultimate level of proficiency in one or both languages. Nevertheless, the model is useful because it is applicable as a tool for understanding both within group variance and between group differences.

What are the model's implications for the present discussion? The intergroup theory of second-language acquisition is a dynamic model that effectively links individual, group, and intergroup level factors in predicting individual bilingualism. Although it only does so in situations of language minority individuals acquiring the dominant language in their community, the theory serves as an example of the way various levels of analysis can be combined within one predictive framework. The theory also helps to highlight how bilingualism reflects more than cognitive capacities and consists of more than a cognitive phenomenon. Its development is a function of intergroup situations, which themselves can vary even within a group.

The model is not without shortcomings for our purposes, however. It's major weakness is that perceptions of the group's linguistic vitality are not linked to the individual's or the group's actual language proficiency. Moreover, the model does not distinguish between dialect differences or ethnic language markers, and language proficiency in the terms we discussed earlier. When attempting to link intergroup variables that predict bilingualism to its cognitive effects, the cognitive functions of what is learned become much more important.

Not much consideration is given, either, to what happens to the learner's first language, for example, as the result of experiences with the second language and the second language group. In terms of accounting for cognitive effects of

bilingualism, the use and maintenance of the first language and what factors may predict this are quite important. As it currently stands, the Ball et al. model includes first language proficiency only as it relates to perceived vitality of the first language. It would also be useful to know how various conditions of second-language acquisition affect learning of the first language. This is especially important when dealing with children, who are at a stage of acquisition in *both* languages.

Despite the shortcomings, as well as the desirability of further empirical illumination of the complexities addressed by the intergroup theories, the student of bilingualism and cognitive development should pay serious attention to the social-psychological and societal perspectives. The models explored here begin to help us better understand the larger shifts that have occurred in research in the course of history, and to gain a handle on macro-level determinants of the types of cognitive bilingualism evidenced in different subject populations.

RESEARCH DIRECTIONS

It should be evident from the discussion in this chapter that the study of the relationship of bilingualism and cognitive development is in many ways a vortex of classic questions about the nature of language, mind, and society. A complete understanding of the problem must come through a multi-layered analysis that considers historical, linguistic, cognitive, social psychological, and sociological perspectives.

In an area as complicated as this one, it is easy to lose sight of the forest for the trees. Each level of analysis carries with it its own set of inherently interesting puzzles. Thus, it would be useful to summarize the set of tension points in the area of bilingualism and cognitive development that any reasonably complete model should address.

The first point has to do with degree of bilingualism of the individuals who are labeled "bilingual." Our historical analysis

revealed that different conclusions could be made depending on who constituted the subject population. Non-balanced bilinguals fared poorly when compared to monolingual counterparts. In contrast, balanced bilinguals were superior to monolinguals. Although considerable additional research needs to be conducted in this area, for example, in determining whether the initial phases or the more developed phases of bilingualism result in an impact on cognitive development, it is clear that degree of bilingualism must be included in any model purporting to account for the relationship between bilingualism and cognition.

Second, in any description of bilingualism, one must distinguish between the different functions to which the languages of the bilingual are put to use. Particularly interesting is the distinction between decontextualized language (used for academic and cognitively demanding tasks) and contextualized language (used for social interactional tasks) skills (e.g., Cummins, 1982, Snow, in press). Presumably, the development of a second language that can be used for decontextualized skills should be distinguished from a second language developed primarily for conversational uses. Similarly, the dichotomy can also be applied to maintenance of the native language. Discussion of possible explanatory cognitive developmental models has suggested that an important link may be the extent to which bilingualism develops an objective awareness of language, followed by the efficient use of language for self-regulatory functions, including academic tasks. One might then speculate that bilingualism in which the use of language for cognitive functions is emphasized (i.e., decontextualized language skills) would lead to more cognitive effects than that developed with an emphasis on contextualized use.

The third point is that the functions of language use can be related to different variables, as suggested by Gardner's research. His social-psychological approach revealed that aptitude and basic intelligence predicted language performance in formal contexts, whereas attitudes and motivational variables

predicted the use of language in informal settings. It seems reasonable to hypothesize that language use in the informal context would tend to be of the contextualized variety while the formal context would call for greater recruitment of decontextualized language. If so, one might speculate that attitudinal and social-psychological factors, since they are more related to contextualized language, would have less of a direct bearing on cognitive development than would basic aptitude factors that are related to decontextualized language skills.

A fourth point is the importance of what happens to the native language in the process of second-language acquisition--whether it is maintained or devitalized. At the individual level, this question is equivalent to the question of the degree of bilingualism mentioned earlier. Depending on the extent to which the native language is maintained or developed, individuals may become balanced or unbalanced bilinguals. At the group level, the vitality of the native language in the group as a whole when in contact with another language, determines whether the bilingualism is additive or subtractive (Lambert, 1975). In general, positive effects of bilingualism are reported in additive settings (which usually consist of majority language children learning the minority language) and negative effects in subtractive ones (consisting mainly of minority children learning the majority language at the expense of their mother tongue). This variable presents an interesting question for future research with respect to the factor of individual degree of bilingualism. Presumably, one could compare subjects who are equivalent in their linguistic proficiencies in two languages but differ in the social circumstances which led them to these proficiencies.

A fifth point is the need to understand bilingualism and cognitive development in the context of intergroup relations. Language and bilingualism can serve as the societal symbols around which ethnic politics are enacted, both at the individual and group levels. Work in this area has suggested the importance

of the role of language as a marker of group membership. Even in cases in which the use of language for symbolic purposes has no direct bearing on the cognitive development of bilingual children, it is important to the extent that language politics affect the types of social and educational environments in which the children develop or fail to develop their two languages. A salient example here is the policy of bilingual education in the United States, in which the debate over the feasibility of the program is clearly an argument over control of the educational system (Paulston, 1980). Such societal processes affect the ways in which group members perceive their own language, the way in which deviation of an individual group member from group norms is perceived by other members of the group, and the extent to which the group maintains its bilingualism or shifts towards monolingualism. These, in turn, will influence the extent to which individual children maintain or lose their native language while acquiring English.

These tension points are not meant to be presented as orthogonal factors. Indeed, the challenge that they pose for the researcher is that they are highly interrelated. For example, balanced bilingualism is generally found in majority groups who hold sizable political power, and who have access to school resources that enable the rapid development of decontextualized uses of both languages. And generally, minority groups have difficulty gaining access to the educational system in such a way that their native language development can be fostered, which would result in an additive bilingual setting that would in turn produce balanced bilingual children.

What should be clear from this broad picture of the major tension points in the literature on bilingualism and cognitive development is that the seemingly straightforward question on the effect of bilingualism on cognitive development actually raises questions of considerable complexity. For example, how is bilingualism accompanied by the full decontextualized functions of both languages different from bilingualism in which only the

oral and contextualized uses of the native language is maintained? In turn, how are these differences related to social-psychological variables and the societal institutions that support them? One can also ask questions about the interactions among levels of analysis in order to identify the appropriate loci for theorizing. For example, *within* bilingual environments defined as additive or subtractive, how is the individual child's level of maintenance of the native language related to cognitive development?

The complexity of such questions is a mixed blessing. On the one hand, it may lead to frustration with a problem that eludes simple empirical formulations. On the other hand, because of the juxtaposition of the variety of issues that have dominated the study of language, mind, and society, there is fertile ground for the desegregation of specializations and subsequent enrichment of each (Hakuta, in press). In our own research in New Haven, we have experienced both aspects of this blessing, and it would seem fit to conclude the chapter with an account of our experience in order to illustrate the intricate dimensions of the problem, and to point out directions for future research.

The Case of New Haven

We began our research with the Puerto Rican Spanish-English bilingual students in New Haven with the specific motivation of conducting a pure assessment of cognitive bilingualism, uncontaminated by extraneous societal factors associated with bilingualism (Hakuta & Diaz, 1985). Specifically, we reasoned that the assessment of variation *within* a group of students who were becoming bilingual would provide a more uncontaminated evaluation than the traditional comparisons of bilinguals and monolinguals.

We found our ideal subject population in the bilingual education program in the New Haven Public Schools. This program, like most bilingual programs currently implemented in the United States, is a transitional program where the goal is to move students into English-only mainstream classes as quickly as

possible. Once the students are out of the program, they no longer receive instruction in Spanish, but while they are in the program, their native language is well supported through instruction in the basic skills. Thus, as the students go through the program, they are adding the second language, English, while maintaining Spanish. We reasoned that the situation minimally simulates additive bilingualism.

Indeed, within the group, as we described in the cognitive section of this chapter, degree of bilingualism correlated significantly with performance on both verbal and nonverbal measures of cognitive performance, thereby supporting the findings of previous studies that used between-group comparisons. Furthermore, there were some indications that the direction of causality went from bilingualism to cognitive ability, rather than in the other direction.

In the strictly cognitive domain, then, we found reason to develop explicit models for why there might be positive consequences of bilingualism on cognitive performance. One of us (Diaz) independently pursued research to test several alternative hypotheses, as described above. At this purely cognitive level, there are several directions for future research that would clarify, develop, and test an explanatory model of how bilingualism might affect children's cognitive development.

One suggestion derives from the observation that the effects of bilingualism are likely to occur even during the initial period when children are exposed to the second language, at least in an additive context. If true, it calls for a detailed ethnographic description of the processes and events (both at the social and intra-personal levels) that characterize the beginning stages of second-language learning.

Another direction comes from the observation that in speaking of cognitive development, we are dealing with a complex relationship between different kinds of knowledge and acquired skills. For example, metalinguistic awareness is a multidimensional construct for which we will require a more

detailed description (Bialystok & Ryan, 1985), especially as it relates to the bilingual experience.

Finally, the integrative hypothesis entertained at the end of the cognitive section assumed that the objectification of language is a function of its systematic use in a social situation including the engagement of language for problem solving. This claim should be made in the context of a theory that specifies the relation between interpersonal and intrapersonal variables. For example, how are the uses of language in the social exchange incorporated into the child's own system of self-regulation? In this context, Soviet developmental theory, as represented in the work of Luria and Vygotsky, can provide a useful framework. In our New Haven sample, the attempt at an evaluation of the effects of pure cognitive level bilingualism rapidly led us to also consider the societal aspects of bilingualism (Ferdman & Hakuta, 1985a, 1985b). Study of the societal level bilingualism in New Haven was stimulated in part because we were frequently asked why we did not compare our sample of students in the bilingual program with other Hispanic students who were not in the program. We did not do so because we knew from the characteristics of the bilingual program and from our informal observations of the community in general that the program drew from a different segment of the Hispanic community than did the regular mainstream program. That is, we strongly suspected the existence of demographic differences within the Hispanic community between those in bilingual and those in mainstream programs. We saw no reason to compare these groups on our cognitive measures because even if differences emerged, we would not be able to interpret them in terms of cognitive hypotheses.

Nevertheless, we were moved to describe our subject population in terms of its group characteristics. Just how it differed with the rest of the Puerto Rican community in New Haven became the question of interest. We felt that such a demographic picture would set the limits on the generalizability of our

cognitive study. In order to gain an understanding of the social-psychological and societal factors related to bilingualism in New Haven, we thus conducted a large-scale survey of the home backgrounds of all elementary school Hispanic children in the New Haven Public Schools. In cooperation with the school system, we sent out questionnaires to the parents of all Hispanic students in the schools that asked them about their backgrounds and their home environment, focusing on language.

Within our New Haven population, we found clear home background differences between students in the bilingual program (i.e., those who were subjects in our studies) and those in the English-only, mainstream classes. Program status of the children was associated (in the predictable directions) with a series of social and demographic variables. These included parents' birthplace, length of residence in the U. S. Mainland, whether the parent was educated primarily on the mainland or in Puerto Rico, parents' employment status, the frequency of moves in the last five years, plans for a future move, and where that move would be to. Also varying as a function of program status were language variables: the language in which the questionnaire was filled out, the parents' self-reported English proficiency, the language used by adults and children at home, the number of English and Spanish books and periodicals in the home, the parents' assessment of the child's ability in English compared to Spanish, and their judgement of the extent of the child's difficulties in Spanish. In general, the demographic survey suggested that in the community of Puerto Ricans in New Haven, the bilingual program -- in which we had found our cognitive results --recruited students from the lower end of the socioeconomic scale (in terms of employment, parent education, and residential mobility). Their homes were also the ones most strongly oriented towards Spanish.

The survey also revealed that the bilingualism in the community as a whole can be characterized as subtractive in nature. Indicators of English and Spanish in the home were

negatively related with each other. Furthermore, length of residence on the mainland was positively associated with English, and negatively with Spanish. However, there were strong indications that the use of Spanish in the home continues to be maintained by a large proportion of the entire Puerto Rican community. For example, 88% of all students reportedly use some Spanish at home. Even among parents born on the mainland, two-thirds reported both English and Spanish use by children at home. Thus the case can be made that there is maintenance of Spanish in this community, even among the long term residents.

However, in thinking about these indications of Spanish maintenance together with an overall subtractive situation, we have found the distinction between contextualized and decontextualized language use to be helpful. Some support for this distinction can be found in our data. Parents' level of education was a good predictor of their self-reported proficiency in English (controlling for whether they were educated on the mainland or in Puerto Rico). We take this to be an indication that at least part of the variance in level of English has to do with "aptitude" or academic-type language. For Spanish, however, we do not have the same indication. We found that level of education was correlated with both the number of English and Spanish books in the home, and number of English periodicals, but not number of Spanish periodicals. The implication is that at least some of the Spanish use, that relating to which newspapers are read, for example, may have to do not with variation in academic language, but rather, with the extent of social identification with Puerto Rican culture.

A slightly more detailed look into choice of newspapers is in order here to illustrate the importance of social psychological dimensions within the societal context. There are two commonly read newspapers in this community: *El Vocero*, a Puerto Rican Spanish-language daily available in New Haven, and *The New Haven Register*, the local English paper. We found that which paper respondents reported reading was clearly related to

English proficiency. On average, the higher their self-reported English proficiency, the more likely they were to read the *Register* in favor of *El Vocero*.

However, English proficiency was by no means the only determinant of choice of newspaper. How can we account for individual variation within particular levels of English proficiency? Why do some people read only the English paper, while others read both the English and Spanish, and others only the Spanish? This may have to do with the kinds of variables contained in social psychological models: for example, orientation to Puerto Rico versus the mainland. We explored this possibility by analyzing responses on the questionnaire to the question of whether they planned to move back to Puerto Rico.

At the low levels of English proficiency, whether respondents planned to move back to Puerto Rico or not was not related to newspaper choice. At an intermediate level, however, it made a large difference. In this group, 62% of those who said they would move to Puerto Rico read *El Vocero*. Only 31% of those who planned to stay in New Haven read *El Vocero*. Thus, within a given proficiency level of English, the individual social psychological orientation seems to have made a difference in the choice of newspaper.

If our cognitive, social-psychological, and societal analysis of the New Haven situation is correct, the following summative picture might be drawn. The Puerto Rican community can be characterized as losing Spanish for decontextualized, academic functions, while maintaining Spanish for use in face-to-face communicative situations. It would appear that level of maintenance of Spanish for conversational use would be related to the social-psychological functions of language, including the establishment of individual social identity, long-term plans about where to take up residence, and attitudes towards one's own group. Loss of the decontextualized functions, on the other hand, may be more related to group and societal level functions, including the availability of programs to maintain Spanish in the

public schools. Currently, for example, there are no classes offered in Spanish as a subject matter in the public schools in the elementary grade levels, even though the students maintain spoken Spanish at home.

The bilingual education program seems to afford some level of maintenance of the native language while students are in it. Students in the program are in a temporary milieu of additive bilingualism, at least until they are placed in mainstream classrooms. They learn to use Spanish for decontextualized tasks in addition to contextualized ones. While in this environment, there is evidence that children experience some positive effects of bilingualism on their cognitive ability. However, it is not clear how long these effects might last, since their Spanish undergoes attrition as soon as they are exited from the program.

As we came to an understanding of our bilingual population that we had originally defined in strictly cognitive terms, (i.e., in terms of their degree of bilingualism), we became increasingly aware that we were only describing one part of the story of the relationship between bilingualism and cognitive development. We had been whittling down the concept of bilingualism using purely cognitive criteria, attempting to remove as much of the societal context as possible. However, social-psychological and societal concerns began creeping in even in trying to define a supposedly individual cognitive variables, such as degree of bilingualism.

The proper understanding of cognitive development in bilingual children can be obtained only through thorough knowledge of how language proficiencies in both languages interplay with the influences of variables that cut across cognitive, social-psychological, societal, and even historical levels of analysis. In that sense, the study of bilingualism and cognitive development is a microcosm of issues that pervade our attempts to understand the relationship between mind, language, and society.

REFERENCES

Ayres, L. P. (1909). Laggards in our schools. New York: Russell Sage Foundation.

Bain, B. (1974). Bilingualism and cognition: Toward a general theory. In S. T. Carey (Ed.), Bilingualism, biculturalism, and education: Proceeding from the Conference at College Universitaire Saint Jean. Edmonton: The University of Alberta.

Bain, B. & Yu, A. (1980). Cognitive consequences of raising children bilingually: One parent, one language.' Canadian Journal of Psychology, 34, 304-313.

Ball, P., Giles, H. and Hewstone, M. (1984). Second-language acquisition: The intergroup theory with catastrophic dimensions. In H. Tajfel (Ed.) The social dimension: European developments in social psychology. Cambridge: Cambridge University Press.

Ben-Zeev, S. (1977). The influence of bilingualism on cognitive strategy and cognitive development. Child Development, 48, 1009-1018.

Bialystok, E. (1984). Influences of bilingualism on metalinguistic development. Paper presented at the National Reading Conference Meeting, St. Petersburg, Florida.

Bialystok, E. & Ryan, E. B. (1985). Towards a definition of metalinguistic skill. Merrill Palmer Quarterly, 31, 229-251.

Brigham, C. C. (1922). A study of American intelligence. Princeton, N.J.: Princeton University Press.

Carroll, J. B. (1962). The prediction of success in intensive language training. In R. Glaser (Ed.), Training research and education. Pittsburgh: Pittsburgh Press.

Cummins, J. (1976). The influence of bilingualism on cognitive growth: a synthesis of research findings and explanatory hypothesis. Working Papers on Bilingualism, 9, 1-43.

Cummins, J. (1978). Metalinguistic development of children in bilingual education programs: Data from Irish and Canadian Ukrainian-English programs. In M. Paradis (Ed.), The Fourth Lacus Forum 1977. Columbia, SC.: Hornbeam Press.

Cummins, J. (1981). The role of primary language development in promoting educational success for language minority students. In California State Department of Education, Schooling and language minority students: A theoretical framework. Los Angeles: Evaluation, Dissemination and Assessment Center, California State University.

Cummins, J. (1982). Linguistic interdependence among Japanese and Vietnamese immigrant children. In C. Rivera (Ed.), The measurement of communicative proficiency: Models and applications. Washington, DC.: Center for Applied Linguistics.

Cummins, J. (1984). Bilingualism and special education: Issues in assessment and pedagogy. San Diego: College-Hill Press.

Darsie, M. L. (1926). The mental capacity of American-born Japanese children. Comparative Psychology Monographs, 3 (15), 1-89.

Diaz, R. M. (1983). Thought and two languages: The impact of bilingualism on cognitive development. Review of Research in Education, 10, 23-54.

Diaz, R. M. (1985). The intellectual power of bilingualism. The Quarterly Newsletter of the Laboratory of Comparative Human Cognition, 7, 16-22.

Diaz, R. M. (in press). Bilingual cognitive development: Addressing three gaps in current research. Child Development.

Diaz, R. M. & Padilla, K. (1985). The self-regulatory speech of bilingual preschoolers. Paper presented at the 1985 Meetings of the Society for Research in Child Development, Toronto, Canada.

Duncan, S. E. & De Avila, E. A. (1979). Bilingualism and cognition: Some recent findings. NABE Journal, 4, 15-50.

Ferdman, B. M. & Hakuta, K. (1985a, April). A population perspective on bilingualism in Puerto Rican children. Paper presented at the Society for Research in Child Development, Toronto.

Ferdman, B. M. & Hakuta, K. (1985b, August). Group and individual bilingualism in an ethnic minority. Paper presented at the American Psychological Association, Los Angeles.

Ferguson, C. A. (1959). Diglossia. Word, 15, 325-340.

Fishman, J. A. (1971). Societal bilingualism: Stable and transitional. In J. A. Fishman, R. L. Cooper & R. Ma (Eds.), Bilingualism in the barrio.

Fishman, J. A. (1977). The social science perspective. In Bilingual education: current perspectives (Vol. 1, Social science). Center for Applied Linguistics, Arlington, Virginia.

Frauenglass, M. & Diaz, R. M. (1985). Self-regulatory functions of children's private speech: A critical analysis of recent challenges to Vygotsky's theory. Developmental Psychology, 21, 357-364.

Galambos, S. (1982, October). The development of metalinguistic awareness in bilingual and monolingual children. Paper presented at the Seventh Annual Boston University Conference on Language Development, Boston.

Gardner, R. C. (1979). Social psychological aspects of second-language acquisition. In H. Giles & R. St. Clair (Eds.), Language and social psychology. Oxford: Basil Blackwell.

Gardner, R. C. (1983). Learning another language: A true social psychological experiment. Journal of Language and Social Psychology, 2, 219-239.

Genesee, F. (1984). Beyond bilingualism: Social psychological studies of French immersion programs in Canada. Canadian Journal of Behavioral Science, 16, 338-352.

Genesee, F., Rogers, P. & Holobow, N. (1983). The social psychology of second-language learning: Another point o f view. Language Learning, 33, 209-224.

Giles, H., Bourhis, R. Y. & Taylor, D. M. (1977). Towards a theory of language in ethnic group relations. In H. Giles (Ed.), Language, ethnicity and intergroup relations. London: Academic Press.

Giles, H. & Byrne, J. L. (1982). An intergroup approach to second-language acquisition. Journal of Multilingual and Multicultural Development, 3, 17-40.

Giles, H. & Johnson, P. (1981). The role of language in ethnic group relations. In J. C. Turner & H. Giles (Eds.), Intergroup behavior. Oxford: Blackwell.

Goodenough, F. (1926). Racial differences in the intelligence of school children. Journal of Experimental Psychology, 9, 388-397.

Gould, S. J. (1981). The mismeasure of man. New York: W. W. Norton.

Gumperz, J. J. (1982). Discourse strategies. Cambridige: Cambridge University Press.

Hakuta, K. (1986). Mirror of language: The debate on bilingualism. New York: Basic Books.

Hakuta, K. (in press). Why bilinguals? In F. Kessel (Ed.), The development of language and language researchers (Essays presented to Roger Brown). Hillsdale, N. J.: Lawrence Erlbaum Associates.

Hakuta, K. & Diaz, R. M. (1985). The relationship between bilingualism and cognitive ability: A critical discussion and some new longitudinal data. In K. E. Nelson (Ed.), Children's language, Volume 5. Hillsdale, N. J.: Lawrence Erlbaum Associates.

Ianco-Worrall, A. (1972). Bilingualism and cognitive development. Child Development, 43, 1390-1400.

Jensen, A. R. (1980). Bias in mental testing. New York: Free Press.

Lambert, W. E. (1967). A social psychology of bilingualism. Journal of Social Issues, 23, 91-109.

Lambert, W. E. (1975). Culture and language as factors in learning and education. In A. Wolfgang (Ed.), Education of immigrant students. Toronto: Ontario Institute for Studies in Education.

Lebrun, Y. & Paradis, M. (1984). To be or not to be an early bilingual? In M. Paradis & Y. Lebrun (Eds.), Early bilingualism and child development. Lisse: Swets & Zeitlinger.

Leopold, W. F. (1949). Speech development of a bilingual child: A linguist's record, Vol. 3, Grammar and general problems. Evanston, Ill.: Northwestern University Press.

Lieberson, S., Dalto, G. & Johnston, M. E. (1975). The course of mother-tongue diversity in nations. American Journal of Sociology, 81, 34-61.

Liedtke, W. W. & Nelson, L. D. (1968). Concept formation and bilingualism. Alberta Journal of Educational Research, 14, 225-232.

Luria, A. R. (1961). The role of speech in the regulation of normal and abnormal behavior. Oxford: Pergamon.

MacNab, G. L. (1979). Cognition and bilingualism: A reanalysis of studies. Linguistics, 17, 231-255.

McLaughlin, B. (1974). Early bilingualism: Methodological and theoretical issues. In M. Paradis & Y. Lebrun (Eds.), Early bilingualism and child development. Lisse: Swets & Zeitlinger.

Paulston, C. B. (1980). Bilingual education: Theories and issues. Rowley, Mass.: Newbury House Publishers.

Paulston, C. B. & Paulston, R. G. (1980). Language and ethnic boundaries. Language Sciences, 2, 69-101.

Peal, E. & Lambert, W. E. (1962). The relation of bilingualism to intelligence. Psychological Monographs, 76 (27, Whole No. 546).

Piattelli-Palmarini, M. (Ed.). (1980). Language and learning: the debate between Jean Piaget and Noam Chomsky. Cambridge, Mass.: Harvard University Press.

Ronjat, J. (1913). Le developpement du langage observe chez un enfant bilingue. Paris: Champion.

Schermerhorn. R. A. (1970). Comparative ethnic relations: A framework for theory and research. New York: Random House.

Smith, M. E. (1939). Some light on the problem of bilingualism as found from a study of the progress in mastery of English among pre-school children of non-American ancestry in Hawaii. Genetic Psychology Monographs, 21, 119-284.

Snow, C. E. (in press). Beyond conversation: Second-language learners' acquisition of description and explanation. In J. Lantolf & R. DiPietro (Eds.), Second-language acquisition in the classroom setting. Norwood, NJ.: Ablex.

Stoddard, G. D. & Wellman, B. L. (1934). Child psychology. New York: Macmillan Company.

Tajfel, H. (1978). Differentiation between social groups: Studies in the social psychology of intergroup relations. European Monographs in Social Psychology, No. 14. London: Academic Press.

Tajfel, H. (1981). Human groups and social categories: Studies in social psychology. Cambridge: Cambridge University Press.

Tajfel, H. & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), The social psychology of intergroup relations. Monterey, CA.: Brooks Cole.

Taylor, D. M. & McKirnan, D. J. (1984). A five-stage model of intergroup relations. British Journal of Social Psychology, 23, 291-300.

Terman, L. M. (1918). The vocabulary test as a measure of intelligence. Journal of Educational Psychology, 9, 452-459.

Thompson, G. G. (1952). Child psychology. Boston: Houghton Mifflin.

Torrance, E. P., Wu, J. J., Gowan, J. C. & Alliotti, N. (1970). Creating functioning of monolingual and bilingual children in Singapore. Journal of Educational Psychology, 61, 72-75.

Vygotsky, L. S. (1962). Thought and language. Cambridge, Mass.: MIT Press.

Young, K. (1922). Mental differences in certain immigrant groups. University of Oregon Publication, Vol. 1, No. 11, July 1922. Eugene, Oregon: The University Press.

Zivin, G. (1979). The development of self-regulation through private speech. New York: Wiley.

FOOTNOTES

This paper was prepared as a technical report for the Center for Language Education and Research under Contract 400-85-1010 from the U. S. Department of Education. It will appear in S. Rosenberg (Ed.), Advances in applied psycholinguistics, Volume II: Reading, Writing and Language Learning. New York: Cambridge Univesity Press.

ABOUT THE AUTHORS

Kenji Hakuta (Ph.D., Experimental Psychology, Harvard University) is Associate Professor of Psychology at Yale University. He is on the staff of CLEAR, through which he conducts research with the bilingual education program in the New Haven Public Schools. His research interests are in language and cognitive development, especially as they relate to the education of language minority children.

Bernardo M. Ferdman (Ph.D. Candidate, Social Psychology, Yale University) is currently Assistant Professor of Psychology and Latin American Studies, State University of New York at Albany. His interests are in the area of intergroup communication and the education of minorities.

Rafael M. Diaz (Ph.D., Developmental Psychology, Yale University) is Assistant Professor of Psychology at the University of New Mexico, Albuquerque. He is primarily interested in the role of language in cognitive activity, which he has investigated in bilingual and monolingual children.